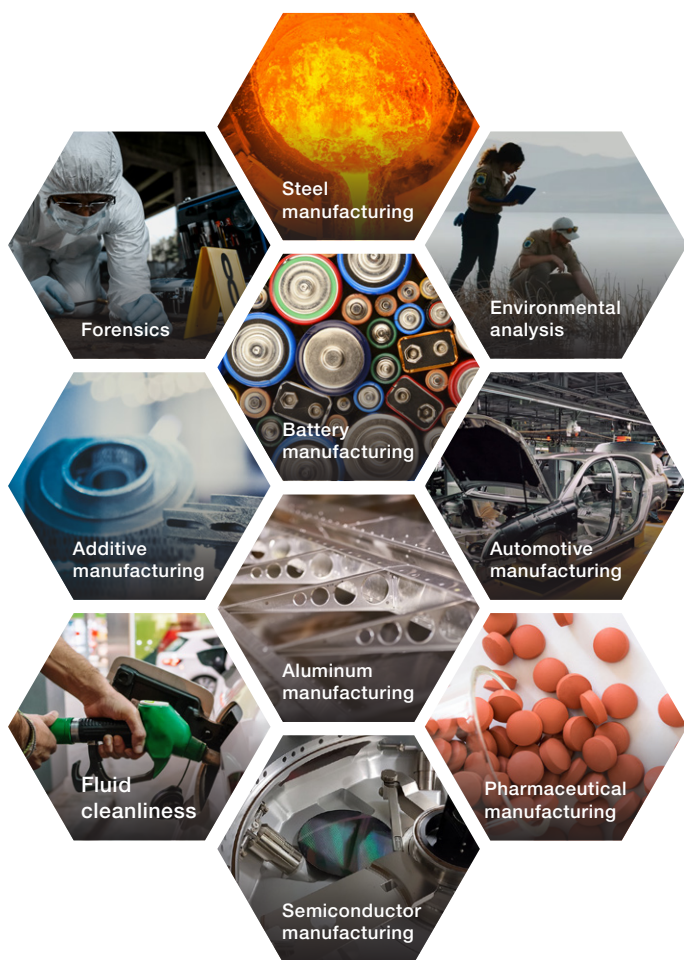**Thermo Fisher**
SCIENTIFIC

Perception Software
Automated particle analysis

Thermo Scientific™ Perception Software delivers advanced automated particle analysis, classification, and unparalleled reporting.

The all-in-one software package turns your Thermo Scientific scanning electron microscope (SEM) into a dedicated particle analysis solution for a range of applications:

Steel manufacturing

Forensics

Environmental analysis

Battery manufacturing

Additive manufacturing

Automotive manufacturing

Aluminum manufacturing

Fluid cleanliness

Pharmaceutical manufacturing

Semiconductor manufacturing

Key features

Optimized workflow: Perception Software seamlessly integrates with Thermo Scientific SEMs, ensuring compatibility, streamlining the workflow, and providing a single point of contact for support

Proven accuracy: Thermo Fisher Scientific brings more than 30 years of experience in automated SEM-EDS particle analysis

24-hour operation: Full automation lets you run your SEM day and night, enhancing efficiency and helping you get more done

Dedicated reporting: Reports can be customized to your needs and automatically generated at the end of each run

thermo scientific

Flexible setup

Perception Software works with the navigation camera in your SEM to make stage setup fast and intuitive, even when imaging multiple samples. For manual runs, you can use the camera to find your area of interest and then gather image and EDS data for quick analysis. And for automated runs, you can simply draw on the camera image to specify which areas to scan.
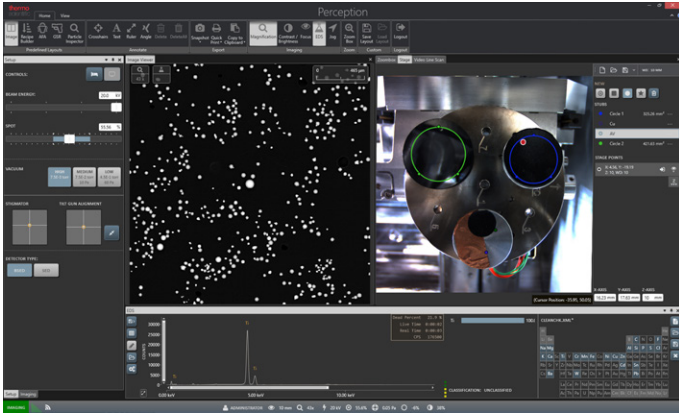

Choosing your areas of interest.

- Click-and-drag functionality lets you create an analysis area of any shape or size

- Sample tilt compensation maintains focus throughout the run

- Dedicated multi-sample holders accommodate stubs, resin mounts, filters, and lollipop samples

- One-click EDS analysis makes manual particle identification quick and easy

Intuitive recipe creation

Perception Software gathers image and EDS data using recipes that are easy to customize. Recipes are made of standard building blocks, which guide you through setting up a run to collect the data you need. There are also standard recipes that work for a variety of applications straight out of the box. To execute a recipe, all you have to do is click a button.
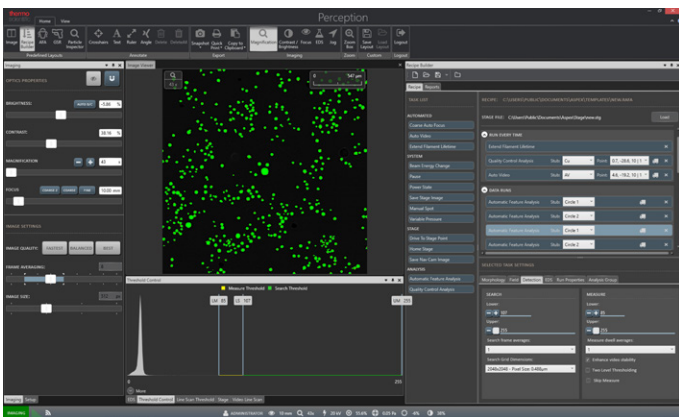

Modifying your analysis recipe

- Click-and-drag recipe creation

- Options to collect more EDS data on particles that meet user-defined criteria

- Comprehensive gray level threshold settings

- In-recipe auto-focus

- In-recipe EDS, brightness, and contrast calibration

- Pre-installed, application-specific recipes and classification rule files

- Fully customizable classification rule files

- Four automated EDS pattern options

- Several run termination criteria, applied on a single run or grouped runs

Efficient analysis

During automated runs, Perception Software continually shows its progress and provides ample feedback to help you monitor the results of the run. EDS spectra is shown with the corresponding image of the particle in real time as it is collected. And when performing multiple runs, you can generate reports of available data as soon as each run finishes.
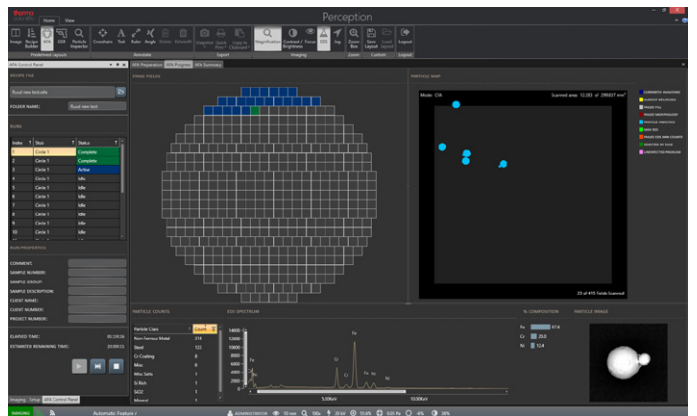

View during live particle analysis

- Automated morphology and EDS data collection

- Classification of particles based on both morphology and EDS data

- Live feedback on analysis progress

- Live visualization of spectra and particle images

- No maximum limit for the number of particles

- Border particle stitching

- Iterative estimation of remaining analysis time

- Brightness stability algorithm to ensure repeatable results

- Option to skip runs during analysis

Effortless reporting

Perception Software's fully automated particle imaging and EDS analysis deliver repeatable, accurate results that become even more valuable with proper visualization. Using the built-in reporting tools, you can create customized reports that suit your exact needs. From histograms, ternary diagrams, and scatter plots to application-specific reports like cleanliness grading and forensics, Perception Software can automatically generate detailed reports that clearly and consistently assemble data.
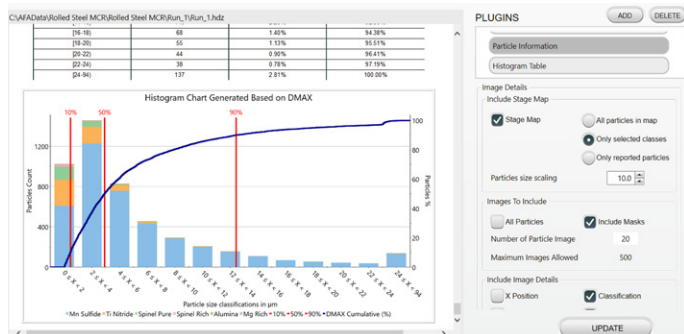

Report template can be modified in Perception Reporter.

- Effortless, integrated report customization

- No programming knowledge required

- Reclassification and requantification of results

- Built-in reclassification during report generation

- Particle relocation and confirmation

- Re-acquisition of particle EDS data

- Automated reporting

- Run properties such as sample or case number can be added to your report

- Data from multiple runs can be merged into one report

- Reports contain all elements required to suit your needs

- Application-specific reporting according to international standards

  - Technical cleanliness: ISO 16232, VDA 19, ISO 4406, ISO 4407

  - Steel cleanliness: ASTM E2142, ASTM E45, ASTM E2283, ISO 4967, JIS G0555, IS 4163, GB/T 30834

  - Gunshot residue: ASTM E1588

  - Battery: GB/T 41704

- Versatile output formats: PDF, Word, Excel, CSV

State-of-the-art EDS detector hardware

Based on Thermo Scientific™ ChemiSEM™ Technology, our algorithm can quickly and accurately quantify the chemical composition of particles within your sample. The fast data processing algorithms deliver accurate quantification of particles, even with limited EDS analysis time during automated runs.
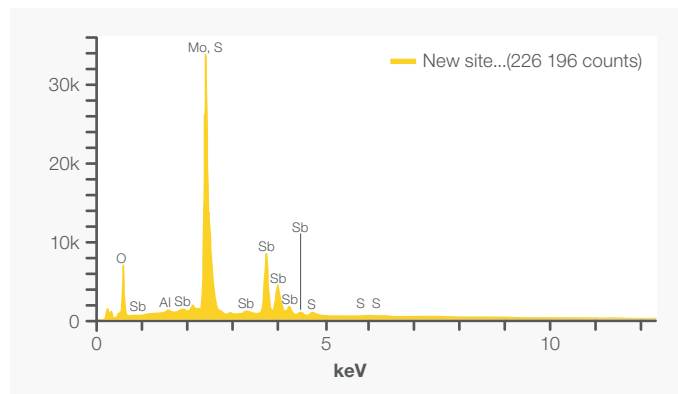
EDS spectrum of an antimony-rich particle.

- Fully embedded EDS hardware integration

  - 25 mm^2 or 70 mm^2 window size

  - Resolution: Mn Kα ≤132 eV

  - Silicon drift detector (SDD)

  - Thermoelectrically cooled (LN$_2$ free)

- Quantification algorithm based on **ChemiSEM Technology**

  - Accurate quantification over a wide range of working distances, beam currents, and beam energies

  - Standardless quantitative analysis using filtered least squared fitting

Choose your SEM

Floor model SEM:
Flexibility and versatility

Desktop SEM:
Compact and dedicated

Thermo Scientific™ **Axia™ ChemiSEM™** Scanning Electron Microscope

Thermo Scientific™ **Phenom™ ParticleX™** Desktop SEM

Learn more at **thermofisher.com/perception**